Faculty of Science - Synopsis to be submitted in front of RRC

Green synthesis of biologically active heterocycles and study of medicinal properties of Ficus Racemosa Linn plant extract

Abstract of proposed work plan/ problem:

1. Introduction

There is immense need of newer options of anti-tubercular drugs as multi drug resistance is developed with existing drugs in tuberculosis bacteria. Many plant produces biologically active phytochemical compounds which are used in today's modern allopathic as well as ayurvedic and other medicinal systems. About 25% market available drugs are pure isolated compounds from plant or their chemical derivatives (O.P Ogunlowa et al).

We have many reports for prominent antimicrobial activity for commonly used plants in ancient systems of medicines (Mandal S.G et al). In this study, we are investigating prominently reported antimicrobial active plant by taking extracts and their fractions for anti-tubercular activity with their synthetic lead compounds produced by green chemistry. Selection of plant is based on its reported articles for antimicrobial activity, Ficus Racemosa Linn (Umber Tree) is selected for this study as these plants are well investigated for its antimicrobial activity (Amit Gupta et al, Choudhuri Pradeep kumar et al, Halyna Tkachenko et al, *Md.Shahadat Hossain et al, Goyal PK*, Krishna Murti et al,) and routinely used in traditional medicines for management of illness (D.M. Manimozhi et al,).

2. Review of Literature and Development in the subject

All the selected plants are well investigated for various medicinal activities and revive literatures are available. Antimicrobial activity (Manimozhi D M et al), Phytochemical composition and pharmacological prospectus (Abhishek Mathur et al, Baby Joseph et al, Tambekar D H et al,), Pharmacognostical evaluation (YV Ushir. Et al.), Analgesic, Antipyretic Activity, Anti-Oxidant Activity, Anti-Diabetic Activity (Ahmed F et al.), Anti-Inflammatory Activity, Cytotoxic Effect of Herbal Extract (Ramesh Patel et al.), Anti-Ulcer (Narasimha Rao et al) and further studied for chemical constituents also(Khan Tabassum et al.)

These plants are well investigated for antimicrobial activity and reported prominent activity. Therefor this plant are selected for antitubercular activities testing with green chemistry aspects.

3. Objectives of Research/ Proposed Hypothesis:
    1) Investigation of Phytoconstituents.
    2) Investigation of Anti tuberculosis activity.
    3) Chemical Synthetic approach for isolated phytoconstituents with green chemistry principles.
    4) Activity testing for synthetic compounds.
    5) Pharmaceutical development.

4. Methodology to be adopted:

    1) Preparation of crude extract – Maceration , Coacervation, Decoction etc
    2) Antituberculosis activity testing assay – Microplate Alamar Blue Assay method () and/or other convenient laboratory methods like cup plate method (Senthil Kumar et al).
    3) Fractionation of crude extracts – Column Chromatography
    4) Structure and functional group detection – Uv IR GC MS HPLC etc
    5) Green chemistry synthesis for new active compounds

5. Importance of study/ Society application:
    1) Therapeutic application as Antitubercular drugs
    2) Possibility of optional drug for resistant tuberculosis infection management.
    3) Report on actual components present in crude extracts of plant and their structure.
    4) Less hazardous synthesis with green chemistry principles.
    5) Poor and developing countries are more suffering with tuberculosis infection.
    6) Synthesis of nitrogen containing heterocycles.
    7) Synthesis of sulpher containing heterocycles.
    8) Biological activity of heterocycles.

6. Proposed work Plan/ Formulation and Structure of Study:

Year-wise Plan of work and targets to be achieved –

1) Plant extract Preparation (One Month)
2) Activity testing (Two Months)
3) Isolation and purification of pure active compound form plant extract. (Three Months)
4) Structural Study (6 months)
5) Green Synthetic approach (One year)
6) Formulation

7. References:

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11) Abhishek Mathur et al,. Phytochemical investigation and in vitro antimicrobial activity of different parts of Ficus racemosa L Der Pharmacia Sinica, 2011, 2 (2):270-275

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